

Claims

1. A separable fastener component for use with a complementary separable fastener component, said separable fastener component comprising:

5 a. a plurality of fastening segments, each fastening segment comprising:

i. a base member, having a nominal fastening face and a non-fastening face; and

10 ii. carried on said fastening face of said base member, a plurality of fastening elements selected from the group consisting of hook-type and loop-type elements; and

b. located between and joining each adjacent pair of fastening segments, a flexible neck that is narrower than said fastening segment.

2. The fastener of claim 1, further comprising, for each of said fastening segments, a barrier for use during an operation to incorporate said fastener into a molded body, using a mold having a wall, which barrier would prevent any
5 liquid foaming material from contacting a major portion of any of said fastening elements if said fastener is placed in said mold with said fastening elements pressed against said wall of said mold.

3. The fastener of claim 1, further comprising an enveloping cover, which substantially covers each said segmented fastening region.

4. The fastener of claim 1, further comprising a removable space filling cover, which substantially fills any spaces among said fastening elements.

5. The fastener of claim 4, said fastening elements being hook-type elements, having free tips, said space filling cover leaving just said tips exposed to any such liquid.

6. The fastener of claim 4, said space filling cover comprising an elastomeric cover.

7. The fastener of claim 4, said space filling cover comprising a thermoplastic cover.

8. The fastener of claim 4, said space filling cover comprising a thermoset cover.

9. The fastener of claim 4, said space filling cover comprising a flexible cover.

10. The fastener of claim 1, further comprising, for each of said segmented fastening regions, a gasket that extends fully around the perimeter of said segmented region.

11. The fastener of claim 10, said gasket comprising a perimeter lip that has been integrally formed with said fastening elements.

12. The fastener of claim 10, said gasket comprising a perimeter lip that has been applied to said base member separately from said fastening elements.

13. The fastener of claim 10, said fastening elements comprising hook-type elements having free tips, said gasket comprising a flexible lip that extends away from said base slightly further than said tips.

14. The fastener of claim 10, said gasket comprising a perimeter space filling gasket that covers fastening elements in a perimeter region of said fastening segment.

15. The fastener of claim 10, said fastening segments comprising an internal region that carries said fastening elements and a perimeter region that carries no fastening elements, said gasket comprising a perimeter space filling gasket that covers said perimeter region that carries no fastening elements.

16. The fastener of claim 2, said base comprising magnetically attractable material.

17. The fastener of claim 1, said flexible neck region being flexible around three orthogonal axes.

18. A method for forming a separable fastener component for use with a complementary separable fastener component, said method comprising the steps of:

5 a. forming a plurality of fastening segments, each fastening segment comprising:

i. a base member, having a nominal fastening face and a non-fastening face; and
ii. carried on said fastening face of said base member, a plurality of fastening elements selected from the group consisting of hook-type and loop-type elements; and

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b. joining each adjacent pair of fastening segments with a flexible neck that is significantly narrower than said fastening segment.

19. The method for forming a separable fastener component of claim 18, said step of forming a plurality of fastening segments comprising the steps of:

- 5 a. providing, on a mold body, a plurality of spaced
apart mold cavities shaped to form said fastening
segments and between and joining each of said
fastening segment mold cavities, a mold cavity shaped
to form said flexible neck;
- 10 b. providing molding material to said mold cavities
under sufficient pressure to force said molding
material into said mold cavities; and
- 15 c. removing said molding material from said cavities
after said material has been formed into said
fastening segments connected by said necks, to form
said fastener component.

20. The method for forming a separable fastener component
of claim 19, said step of providing molding material comprising
providing molding material to said mold cavities directly
through an extrusion nozzle that is closely spaced from said
5 mold cavities.

21. The method for forming a separable fastener component
of claim 19, said mold body comprising a mold wheel carrying
said mold cavities on a peripheral edge, said step of providing
molding material comprising:
- 5 a. providing a second wheel with a peripheral edge
closely spaced from said mold wheel so as to form a
nip therebetween; and
- 10 b. providing molding material to said nip such that
molding material is forced into said mold cavities
under pressure generated at said nip between said
molding wheel and said second wheel.

22. The method for forming a separable fastener component
of claim 19, said mold body comprising a plurality of mold
plates having similarly curved arcuate edges that are arranged

parallel to each other, said mold cavities being formed in said
5 arcuate edges.

23. The method for forming a separable fastener component of claim 22, said mold plates comprising circular mold plates.

24. The method for forming a separable fastener component of claim 22, said mold plates comprising segments of a circle, said arcuate edges of said segments comprising a portion of a circle, certain of said mold plates being supported so that
5 they are movable in a radial direction relative to said arcuate edge, thereby facilitating removal of a molded fastener component from said mold cavities, said step of removing molding material from said cavities comprising the step of moving radially inward said movable plates so as to release
10 said molded material.

25. The method for forming a separable fastener component of claim 19, said step of providing molding material comprising providing molding material to said mold cavities through an injection mold having at least two parts.

26. The method of claim 18, each fastener segment further comprising, a gasket that extends fully around the perimeter of said segmented region, at least as far from said base member as said fastening elements.

27. The method of claim 19, each fastener segment further comprising, a gasket that extends fully around the perimeter of said segmented region, at least as far from said base member as said fastening elements, said method further comprising the
5 steps of providing, on said mold body, for each of said plurality of spaced apart mold cavities shaped to form said fastening segments, a mold cavity shaped to form said perimeter gasket, further comprising, substantially simultaneously with said step of providing molding material to said fastening
10 segment mold cavities, the step of providing molding material to said perimeter gasket mold cavities under sufficient

pressure to force said molding material into said perimeter gasket mold cavities.

28. A molded polymeric body, said body comprising:

- a. an internal body volume;
- b. at least one surface;
- c. a separable fastener component, adhered to said surface, said fastener component comprising:

- i. a plurality of fastening segments, each fastening segment comprising:

- A. a base member, having a nominal fastening face and a non-fastening face; and

- B. carried on said fastening face of said base member, a plurality of fastening elements selected from the group consisting of hook-type and loop-type elements, said fastening elements extending away from said internal volume; and

- ii. located between and joining each adjacent pair of fastening segments, a flexible neck that is narrower than said fastening segment.

29. The molded polymeric body of claim 28, said separable fastener component further comprising, surrounding said fastening elements of each of said fastening segments, a perimeter gasket, which is unitary with said base member.

30. The molded polymeric body of claim 29, said gasket comprising a lip that extends from said base member at least as far as said fastening elements extend from said base member.

31. The molded polymeric body of claim 29, said fastener component being arranged such that segments of said fastener component are angled relative to each other, within a plane defined by said base members of said fastening segments.

32. A method for forming a molded polymeric body carrying a segmented, separable fastener component, said method comprising the steps of:

- 5 a. providing a mold, having at least one surface that has a trench therein, where said trench follows a path that has at least two portions that are angled relative to each other in a plane;
- 10 b. locating in said trench a separable fastener component comprising:
 - i. a plurality of fastening segments, each fastening segment comprising:
 - 15 A. a base member, having a nominal fastening face and a non-fastening face; and
 - 20 B. carried on said fastening face of said base member, a plurality of fastening elements selected from the group consisting of hook-type and loop-type elements, said fastening segments located with said fastening elements extending toward said mold surface; and
 - 25 ii. located between and joining each adjacent pair of fastening segments, a flexible neck that is narrower than said fastening segment, said separable fastener component arranged in said

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trench such that it bends at said necks so that it follows said path throughout said at least two portions that are angled relative to each other, such that segments of said fastener component are angled relative to each other, within a plane defined by said base members of said fastening segments;

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c. providing liquid molding material into said mold such that said molding material substantially covers at least said surface of said mold in which said trench resides, and such that molding material contacts a significant portion of said base member of said fastening component, while simultaneously preventing said liquid molding material from contacting said fastening elements;

d. allowing said molding material to solidify to form said molded polymeric body, whereby said fastening component is secured to said molded body.

33. The method of forming a molded body of claim 32, where each of said fastening segments comprises a gasket that extends fully around the perimeter of said segmented region, said step of preventing said liquid molding material from
5 contacting said fastening elements comprising pressing said gasket toward said mold surface such that molding material is blocked from contacting said fastening elements.

34. The method of claim 33, said gasket comprising a perimeter lip that has been integrally formed with said fastening elements.

35. The fastener of claim 33, said gasket comprising a perimeter lip that has been applied to said base member separately from said fastening elements.

36. An apparatus for fabricating a strip of a separable fastening component, said apparatus comprising:

5 a. a plurality of mold plates, designated a fastener forming zone, having similar arcuate edges and comprising:

i. fastening element mold cavities intersecting these edges and one face of the mold plate, said mold cavities being arranged into a plurality of segment forming regions;

10 ii. circumscribing each of said segment forming regions, a gasket mold cavity; and

iii. between each adjacent pair of segment forming regions, a hinge forming region;

15 said mold plates being arranged to form a cylindrical mold wheel having a circular surface formed by said arcuate edges of said mold plates such that said segment forming regions are spaced apart circumferentially around said cylindrical surface; and

20 b. an extruder having a die whose surface is disposed close to said cylindrical surface for delivering moldable polymeric material to said mold cavities to form upstanding members and also to said surface to form therewith a polymeric base member
25 strip to which said upstanding members formed in the mold cavities are integrally attached.

37. The apparatus of claim 36, each of said plates comprising a circular plate.

38. The apparatus of claim 36, each of said plates comprising less than an entire circular plate, said apparatus further comprising, for each fastener forming zone, a group of said plurality of plates, said members of said group being
5 arranged with said arcuate edges forming said circular cylindrical surface of said mold wheel.

39. The apparatus of claim 36, further comprising additional pluralities of fastening plates, each of said additional pluralities comprising another fastener forming zone, said additional pluralities being arranged axially along
5 said circular cylinder mold wheel to form side-by side fastener forming zones.

40. An apparatus for fabricating a strip of a separable fastening component, said apparatus comprising:

a. a plurality of mold plates, designated a fastener forming zone, having similarly curved edges and
5 comprising:

i. fastening element mold cavities intersecting these edges and one face of the mold plate, said mold cavities being arranged into a plurality of segment forming regions;

10 ii. circumscribing each of said segment forming regions, a gasket mold cavity; and

iii. between each adjacent pair of segment forming regions, a hinge forming region;

15 said mold plates being arranged to form one component of a multi-piece injection molding assembly having a surface formed by said edges of said mold plates, such that said segment forming regions are spaced apart along said surface; and

20 b. a second component of said injection molding
assembly, matable with said surface of said first
component; and

 c. disposed within at least one of said components
of said assembly, passages for delivering moldable
polymeric material to said mold cavities to form
25 upstanding members and also to form therewith a
polymeric base member strip to which the upstanding
members formed in the mold cavities are integrally
attached.

41. The apparatus of claim 40, said second component
further comprising complementary molding cavities to form said
base member and to define edges of said base member strip.

42. The apparatus of claim 40, further comprising means
for removing a molded article from said molding assembly and
advancing said molded article along a path, and then joining
said advanced molded article to another molded article to be
5 subsequently formed in said mold assembly.